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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/338,520	06/23/1999	SUNGHO JIN	2925-0329P	1494

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EXAMINER

CLOVE, THELMA S

ART UNIT PAPER NUMBER

2879

DATE MAILED: 08/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/338,520

Applicant(s)

JIN ET AL.

Examiner

Thelma S Clove

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3,6,9-15,17-22 and 36 is/are pending in the application.
- 4a) Of the above claim(s) 23-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,6,9-12,14-22 and 36 is/are rejected.
- 7) ☒ Claim(s) 13 and 17-22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 17-22 are objected to because of the following informalities: Claims 17-22 depend from claim 16, which has been cancelled. For the purposes of further examination, it has been assumed that claims 17 and 22 were intended to depend from claim 1. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 21 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claims 21 and 22 are not in accordance with the specification. Claims 21 and 22 depend from claim 1, which comprises a buffer layer that alters or alters and blocks the substrate. However, the specification teaches that the embodiment claimed in claims 21 and 22, specifically, the Re/Ta buffer with the Ta substrate, blocks but does not alter the substrate (on page 5 lines 12-14). This is inconsistent with claim 1.

### ***Claim Rejections - 35 USC § 102***

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-3, 6, 9-12 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Saito et al. (US 6124666).
6. Regarding claim 1, Saito teaches a thermionic cathode comprising a substrate (1), an emissive layer (5), and a buffer (4) located between the substrate and the emissive layer which inhibits the interaction of the emissive layer and the substrate by way of altering and blocking the substrate (in column 3 lines 15-25, column 6 lines 15-35 and figure 1).
7. Regarding claims 2, 3 and 36, Saito teaches the buffer layer altering the substrate by randomizing and miniaturizing the grain structure of the substrate (in column 6 lines 29-38).
8. Regarding claim 6, Saito teaches the buffer material dissolving further into the substrate to form an alloy with the substrate material (in column 6 lines 19-22).
9. Regarding claim 9, Saito shows the cathode having a curved shape in figure 1.
10. Regarding claim 10, Saito teaches the buffer as a solid solution (in column 6 lines 11-14).
11. Regarding claims 11 and 12, Saito teaches the buffer comprising tungsten, molybdenum and tantalum (in column 3 lines 18-20).
12. Regarding claim 17, Saito teaches the buffer as an alloy (in column 6 lines 29-32).
13. Regarding claim 18, Saito teaches the buffer as an alloy of nickel and tungsten, which have different crystalline structures (in column 6 line 19).

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14. Regarding claim 19, Saito teaches the buffer as a grain growth inhibitor (in column 6 lines 29-32).
15. Claims 1 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Buxbaum.
16. Regarding claim 1, Buxbaum teaches a thermionic cathode comprising a substrate (1), a buffer layer (3), and an emissive layer (2), wherein the buffer layer alters and blocks the substrate by diffusing into the substrate material (in column 3 lines 30-38 and column 2 lines 41-45).
17. Regarding claim 20, Buxbaum teaches the buffer layer comprising at least one of Re, Hf, Os, Ru along with alloys of these elements (in column 2 lines 50-53).

***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al. 9US 6124666).
20. Regarding claims 14 and 15, Saito teaches a cathode according to claim 1, as applied above.
21. Saito does not teach the cathode used in a projection electron lithography system, or in the SCALPEL system.
22. The Applicant states that W. Delvore teaches that a SCALPEL electron lithography process requires a cathode with an extremely small work function variation (on page 3 lines 15-19).

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23. Saito teaches that the buffer according to claim 1, helps to miniaturize the grain structure on the substrate (in column 6 lines 29-32), which inherently makes the work function more uniform across the cathode.

24. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the cathode of Saito in a SCALPEL electron lithography system, since the system requires a cathode with a uniform work function and the buffer layer of Saito improves the uniformity of the work function of the cathode by miniaturizing the grain structure at the substrate.

***Allowable Subject Matter***

25. Claims 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

26. The following is a statement of reasons for the indication of allowable subject matter: Regarding claim 13, the prior art neither shows nor suggests a thermionic cathode comprising a substrate, buffer layer and emissive layer, wherein the buffer layer comprises Mo, Ta, and W and the substrate and emissive layer are Ta, in combination with the other limitations of claim 1

27. The closest art is Saito, as applied to claim 12 above. However, Saito teaches the substrate comprising nickel rather than tantalum and the emissive layer as an alkaline earth metal oxide and rare earth metal oxide rather than tantalum.

28. The Applicant teaches that a cathode having a tantalum substrate and emissive layer with a Ta, W, Mo buffer has a reduced grain misorientation, which makes the work function distribution more uniform for the cathode.

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***Response to Arguments***

29. Applicant's arguments with respect to claims 1-3, 6, 9-12, 14-15, 17-19 and 36 have been considered but are moot in view of the new ground(s) of rejection.

30. Applicant's arguments with respect to claims 1 and 20 filed 7/1/02 have been fully considered but they are not persuasive. Applicant argued that Buxbaum blocks, but does not alter the substrate. In column 2 lines 41-45, Buxbaum teaches that the buffer material diffuses into the substrate material, but at a shallower depth than the diffusion promoting additive. Thus, it is the examiner's position that the buffer layer, by diffusing into the substrate, does alter the substrate.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thelma S Clove whose telephone number is (703) 308-6548. The examiner can normally be reached on Monday-Friday from 8 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



TSC

August 13, 2002



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